Tarefa Básica – Teorema do Binômio – Kaic Motta

① $(x+a)^n = \binom{n}{0} \cdot x^n + \binom{n}{1} \cdot x^{n-1} \cdot a^1 + \dots + \binom{n}{p} \cdot x^{n-p} \cdot a^p + \dots + \binom{n}{n} \cdot a^n$

$(1-2x)^6 = \binom{6}{0} \cdot 1^6 + \binom{6}{1} \cdot 1^5 \cdot (-2x)^1 + \binom{6}{2} \cdot 1^4 \cdot (-2x)^2$

x^2, é o coeficiente do termo:

$\binom{6}{2} \cdot 1^4 \cdot (-2x)^2 \rightarrow \binom{6}{2} \cdot 1 \cdot 4x^2 \rightarrow \frac{6!}{2! \cdot (6-2)!} = \frac{6 \cdot 5 \cdot \cancel{4!}}{2! \cdot \cancel{4!}} = \frac{30}{2} = 15$

$15 \cdot 1 \cdot 4x^2 \rightarrow \boxed{60x^2}$ Coeficiente é 60. (a)

② $(14x - 13y)^{237} = (14.1 - 13.1)^{237} = 1^{237} = 1$ (B)

③ $T_{k+1} = \binom{11}{k} x^{11-k} a^k = 1386x^5$

$11 - k = 5$

$k = 6$ (a)

$T_{6+1} = \binom{11}{6} x^{11-6} a^6 = 1386x^5$

$T_7 = \binom{11}{6} x^5 a^6 = 1386x^5$

$T_7 = \frac{11}{6!\,5!} a^6 = 1386$

$T_7 = \frac{11.10.9.8.7.6}{6!\,5!} a^6 = 1386$

$T_7 = \frac{55440}{120} a^6 = 1386$

$462\, a^6 = 1386$

$a^6 = \frac{1386}{462}$

$a^6 = 3$

$\boxed{a^6 = \sqrt[6]{3}}$

⑦ $(2x+y)^5$

$(a+b)^n = \binom{n}{0} a^n b^0 + \binom{n}{1} a^{n-1} b^1 + \dots + \binom{n}{n-1} a^1 b^{n-1} + \binom{n}{n} a^0 b^n$

$(2x+y)^5 = \binom{5}{0} (2x)^5 y^0 + \binom{5}{1} (2x)^4 y^1 + \dots + \binom{5}{4} (2x)^1 y^4 + \binom{5}{5} (2x)^0 y^5$

$\binom{5}{0} 2^5 + \binom{5}{1} 2^4 + \binom{5}{2} 2^3 + \binom{5}{3} 2^2 + \binom{5}{4} 2^1 + \binom{5}{5} 2^0$

$= 2^5 + 5.2^4 + 10.2^3 + 10.2^2 + 5.2 + 1$

$= 32 + 80 + 80 + 40 + 10 + 1 = 243$ (c)